

Docket: 8071-188T (OPP030864US)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant: Dae-Ho CHOO, et al.

Examiner: Timothy L. Rude

Serial No.: 10/602,054

Group Art Unit: 2871

Filed: June 24, 2003

Docket: 8071-188T (OPP030864US)

For: **IN-LINE SYSTEM AND METHOD FOR MANUFACTURING LIQUID  
CRYSTAL DISPLAY**

Mail Stop: Appeal Brief-Patents  
Commissioner for Patents  
P.O. Box 1450  
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**REPLY TO EXAMINER'S ANSWER**

Sir:

In response to the Examiner's answer dated September 18, 2009 in connection with the  
above-referenced patent application, please consider the following.

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## TABLE OF CONTENTS

	<u>Page</u>
1. REAL PARTY IN INTEREST.....	5
2. RELATED APPEALS AND INTERFERENCES.....	5
3. STATUS OF CLAIMS.....	5
4. STATUS OF AMENDMENTS.....	5
5. SUMMARY OF CLAIMED SUBJECT MATTER.....	6
6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.....	6
7. ARGUMENTS.....	7

A. Claim 57 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,978,065 to Kawasumi et al. ("the Kawasumi patent") in view of Japanese Patent Application Publication No. JP 56114928 to Adachi ("the Adachi publication") and U.S. Patent No. 6,222,603 to Sakai et al. ("the Sakai patent").....7

(i) *Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes " a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant", as required by claim 57.* .....7

(ii) *Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes " a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a*

*second compression plate; and an exposure unit hardening the sealant," as required by claim 57.....11*

B. Claims 58 and 60 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai as applied to claim 57 above, and further in view of U.S. Patent No. 2,394,293 to Deem ("the Deem patent").....15

*(i) The Deem reference fails to cure the above-mentioned deficiencies of Kawasumi and Adachi references with regard to claim 57 and as claims 58 and 60 depend from claim 57, these dependent claims are likewise patentable over the combination Kawasumi in view of Adachi, Sakai and Deem for at least the same reasons as set forth above with regard to claim 57.....16*

*(ii) The combination of Kawasumi in view of Adachi, Sakai and Deem clearly do not teach or suggest all of the specific features of either of claims 58 and 60.....17*

C. Claims 61-65 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai, and further in view of U.S. Patent No. 5,731,860 to Harada et al. ("the Harada patent").....19

*(i) The Harada reference fails to cure the above-mentioned deficiencies of Kawasumi and Adachi references with regard to claim 57 and as claims 62-65 depend from claim 57, these dependent claims are likewise patentable over the combination Kawasumi in view of Adachi, Sakai and Harada for at least the same reasons as set forth above with regard to claim 57.....19*

*(ii) The combination of the Kawasumi, Adachi, Sakai and Harada references at the very least fails to teach or suggest all of the specific features recited in each of claims 62-65..  
.....21*

IV. Conclusion.....	21
<b>CLAIMS APPENDIX.....</b>	<b>23</b>
<b>EVIDENCE APPENDIX.....</b>	<b>None</b>
<b>RELATED PROCEEDINGS APPENDIX.....</b>	<b>None</b>

## **1. REAL PARTY IN INTEREST**

The real party in interest is Samsung Electronics Co., Ltd, by virtue of assignment dated March 28, 2001 and recorded July 16, 2001 in the United States Patent and Trademark Office at reel 011988 and frame 0300. The above assignment is for U.S. Patent Application Serial No. 09/838,385, filed April 20, 2001, now issued as U.S. Patent No. 6,657,701, of which the present application serial no. 10/602,054, filed June 24, 2003 is a divisional. Pursuant to MPEP 306, the assignment of an application carries over to a continuation or a divisional of that application.

## **2. RELATED APPEALS AND INTERFERENCES**

The following related and commonly assigned U.S. patent application is under appeal:

a) U.S. Patent Application Serial No. 10/878,395 is currently under appeal and a Request for Rehearing was filed on April 9, 2009.

## **3. STATUS OF THE CLAIMS**

Claims 57-77 are pending. Claims 59 and 66-77 have been withdrawn. Claims 1-56 and 61 have been canceled. Claims 57, 58, and 60-65 stand rejected and are under appeal. A copy of the claims under appeal is presented in the Claims Appendix attached herewith. Applicants wish to point out that the rejection to claim 61 by the Examiner was in error because this claim was already canceled by Applicants in their response filed on December 1, 2008 with the United States Patent and Trademark Office.

## **4. STATUS OF THE AMENDMENTS**

No amendments were made after Final Rejection.

## **5. SUMMARY OF CLAIMED SUBJECT MATTER**

It is to be understood that the following description of the claimed subject matter and references to the specification and drawings are for illustrative purposes only to provide some context for the claimed subject matter, but shall not be construed as placing any limitations thereon or limiting the scope thereof.

An in-line system for manufacturing liquid crystal displays is provided. As set forth in claim 57, an in-line system for manufacturing liquid crystal displays comprises a first loading unit (See, e.g., Application at page 6, lines 7-8 and Figure 3 at reference numerals 1000); a substrate-combination unit operatively connected to the first load unit, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon (See, e.g., Application at pages 10, line 21-page 11, line 2 and Figure 3 at reference numerals 110, 120, 1000 and 6000); an in-line convey unit (See, e.g., Application at pages 6, line 15 and Figure 3 at reference numerals 1110, 1120, 1130, 1140, 1150, 1170 and 1180); and a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state (See, e.g., Application at pages 11, lines 3-6 and Figure 3 at reference numerals 110, 120, 1170, 6000 and 8000), wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant (See, e.g., Application at pages 11, lines 7-20 and Figure 3 at reference numerals 110, 120, 8000, 8100 and 8200) .

## **6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

A. Claim 57 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,978,065 to Kawasumi et al. ("the Kawasumi patent") in view of Japanese Patent Application Publication No. JP 56114928 to Adachi ("the Adachi publication") and U.S. Patent No. 6,222,603 to Sakai et al. ("the Sakai patent").

B. Claims 58 and 60 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai as applied to claim 57 above, and further in view of U.S. Patent No. 2,394,293 to Deem ("the Deem patent").

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## **7. ARGUMENTS**

A. **Claim 57 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,978,065 to Kawasumi et al. ("the Kawasumi patent") in view of Japanese Patent Application Publication No. JP 56114928 to Adachi ("the Adachi publication") and U.S. Patent No. 6,222,603 to Sakai et al. ("the Sakai patent").**

(i) **Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes " a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant", as required by claim 57.**

Applicants maintain their position from the Appeal Brief filed on June 22, 2009 that the combination of Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes " a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two

substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant”, as required by claim 57.

As conceded by the Examiner on pages 6-7 of the Examiner’s answer dated September 18, 2009 and pages 5-6 of the Final Office Action dated February 20, 2009, the combination of the Kawasumi patent and the Adachi publication at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-attaching unit having a substrate-attaching vacuum chamber which includes a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other and an exposure unit hardening the sealant, as required by claim 57.

The Examiner attempts to cure the above-mentioned deficiencies of the combination of Kawasumi and Adachi references by citing the Sakai reference in the Final Office Action dated February 20, 2009. **(See Page 7 of the Examiner’s Answer dated September 18, 2009 and page 6 of the Final Office Action dated February 20, 2009).** The Examiner contends that it would have been obvious to one skilled in the art to modify the LCD system of Kawasumi and Adachi with the substrate attaching unit described in the Sakai reference. **(See Page 9 of the Examiner’s Answer dated September 18, 2009 and page 7 of the Final Office Action dated February 20, 2009 and).**

However, as Applicants previously noted in Appellants’ Appeal Brief dated June 22, 2009, the Examiner cannot modify the Kawasumi and Adachi references in the manner set forth in the Final Office Action dated February 20, 2009 to include the teachings of the Sakai reference because at the very least the Kawasumi reference teaches away from the Examiner’s proposed modification. Thus, the Examiner erred in combining the Kawasumi, Adachi and Sakai references in the manner set forth in the Final Office Action dated February 20, 2009 and therefore the above rejections to claim 57 are defective as discussed below.

Furthermore, the Examiner’s assertion in the Examiner’s Answer dated September 18, 2009 that the Kawasumi reference does not teach away from combining the Kawasumi, Adachi and Sakai references in the manner set forth in the Final Office Action dated February 20, 2009



is unsupported by the U.S. patent laws and thus is completely without merit for at least the reasons discussed below.

In particular, the Examiner on page 12 of the Examiner's answer dated September 18, 2009, appears to define the standard for teaching away as set forth below:

*"A prohibited teaching away under patent law entails a base reference disclosure (in this case) that the invention WILL NOT WORK with the modification taught by the secondary reference."*

The Examiner goes on to state in the Examiners' answer dated September 18, 2009, that the Kawasumi reference clearly teaches that vacuum conditions are optional, and that it is preferred to eliminate vacuum conditions to avoid higher costs, but that Kawasumi does not disclose that his invention "will not work" with vacuum conditions.

Applicants respectfully disagree with the Examiner's analysis of what the standard is for teaching away according to the U.S. patent laws as explained in detail below. Namely, the standard set forth above by the Examiner is not the correct standard in accordance with the U.S. patent laws for determining whether or not a reference teaches away from a proposed modification and/or combination with another reference. Specifically, there is no mention whatsoever anywhere in the U.S. patent laws that it must be shown that the proposed modification will not work in the invention of the primary reference in order to establish that the reference teaches away from such a modification and/or combination. Rather, a reference may be found to teach away irrespective of whether or not the proposed modification to the reference will or will not work with the invention of that reference.

Furthermore, the Examiner has failed to provide reference to any valid legal authority under the U.S. patent laws on the record which supports the above "will not work" definition for teaching away as set forth by the Examiner. Instead, the Examiner only cites to something on page 13 of the Examiner's Answer dated September 18, 2009, that he refers to as the "QAS" in an attempt to support his teaching away definition. However, Applicants submit that they have even never heard of the "QAS", nor has the Examiner even stated what the acronym "QAS"

stands for or means, and what location (e.g. page numbers, paragraphs and/or sections) of the “QAS” where the authority for his reasoning may be found. Thus, Applicants submit that “QAS” does not provide any support for his above definition for teaching away. Furthermore, Applicants note that the Examiner’s definition of teaching away in the Examiner’s answer dated September 18, 2009 is also clearly unsupported by the U.S. patent laws. The correct standard for teaching away in accordance with the U.S. patent laws, is set forth and explained below.

As Applicants stated in the Appeal Brief dated June 22, 2009, the correct standard in accordance with the U.S. patent laws for determining whether or not a reference teaches away from a proposed modification and/or combination with another reference is that a teaching away may be found when a reference criticizes, discredits, or otherwise discourages the solution claimed. (See MPEP 2142.01, paragraph VI).

Applying the above-mentioned correct standard for determining teaching away in accordance with the U.S. patent laws to the cited references of Kawasumi, Adachi and Sakai, one of ordinary skill in the art would clearly be lead away/discouraged by the disclosure of the Kawasumi reference from applying the teachings of the Sakai reference with regard to vacuum conditions to modify the apparatus of Kawasumi and Adachi as explained below.

The Examiner states in the Examiners’ answer dated September 18, 2009, that the Kawasumi reference clearly teaches that vacuum conditions are optional, and that it is preferred to eliminate vacuum conditions to avoid higher costs. Applicants disagree with the Examiner that Kawasumi teaches that vacuum conditions are optional with it’s invention. In contrast, Applicants submit that Kawasumi does not teach that vacuum conditions are optional with the invention described in Kawasumi. The Examiner appears to be confusing the fact that while Kawasumi may mention vacuum conditions in the background section of that patent, the Kawasumi reference only does so for the purpose of teaching away from using vacuum conditions but nowhere in the Kawasumi reference does it state that vacuum conditions are optional for use with it’s invention.

Rather, Kawasumi teaches that it’s invention is a complete replacement to using vacuum conditions. In particular, the Kawasumi reference states in its disclosure what it perceives to be

disadvantages and problems associated with using vacuum conditions (e.g. long manufacturing times and costly manufacturing costs), thereby having the effect of discrediting the use of vacuum conditions and discouraging one skilled in the art from using these conditions. (See Col. 1, lines 26-50 and Col. 7, lines 4-7 of the Kawasumi patent). The above statements are further supported by the fact that, none of the embodiments described in Kawasumi use vacuum conditions. Rather, a major purpose of the invention described in Kawasumi is to avoid using vacuum conditions altogether and thus the use of vacuum conditions with the invention of Kawasumi according to the teachings of Kawasumi is not optional.

In sum, as Kawasumi describes its apparatuses as a complete replacement for and which overcomes the disadvantages and problems associated with equipment which utilize vacuum conditions for LCD manufacture, the Kawasumi reference thus clearly teaches away from the use of vacuum conditions. Consequently, for at least the reasons set forth above, one skilled in the would be lead away/discouraged by the disclosure of the Kawasumi reference from applying the teachings of the Sakai reference with regard to vacuum conditions to modify the apparatus of Kawasumi and Adachi.

Therefore, for at least the reasons set forth above, the Examiner erred in combining Kawasumi and Adachi with the Sakai reference in the Final Office Action dated February 20, 2009 and thus the above rejections to claim 57 are defective. Accordingly, the above rejection to claim 57 under 35 U.S.C. §103(a) should be reversed.

(ii) Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes “a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant,” as required by claim 57.

As noted above, the Kawasumi, Adachi and Sakai references are not combinable in the manner proposed by the Examiner in the Final Office Action dated February 20, 2009.

Applicants also maintain their position from the Appeal Brief dated June 22, 2009 that even assuming arguendo, that the Kawasumi, Adachi and Sakai references were combinable, this combination would still fail to teach or suggest all of the features recited in claim 57 as explained below.

Claim 57, recites, *inter alia*, “ an in-line system for manufacturing liquid crystal displays comprising: a first loading unit; *a substrate-combination unit operatively connected to the first load unit*, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon; an in-line convey unit; *and a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and an exposure unit hardening the sealant.* (emphasis added).

At the very least, the combination of Kawasumi, Adachi and Sakai with each other at the very least fails teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features, as required by claim 57.

In particular, as pointed out in the Appeal Brief dated June 22, 2009, Kawasumi and Adachi at the very least clearly fail to teach or suggest either one of the substrate combination unit and the substrate attaching unit having the vacuum chamber which includes a first compression plate and a second compression plate and an exposure unit recited in claim 57. Moreover, the Sakai reference fails to cure the above-mentioned deficiencies of the Kawasumi

and Adachi references because while the Sakai reference may disclose a vacuum chamber 8 in which a substrate attaching unit conjoins a first substrate and a second substrate, the Sakai reference at the very least is still silent regarding a substrate combination unit, as required by claim 57. (See Col. 6, line 53-Col. 7 and Fig. 3 of the Sakai reference). In other words, in Sakai, there is no teaching or suggestion whatsoever of a substrate combination unit in combination with vacuum chamber 8 as required by claim 57.

Further, as mentioned in the Appeal Brief dated June 22, 2009, not only do the above cited references fail to teach or suggest the above-mentioned limitations recited in claim 57, the Examiner himself has also failed to even allege anywhere on the record that the cited references, including the Kawasumi, Adachi and/or Saki references teach or suggest all of the features recited in claim 57. In particular, the Examiner failed to allege anywhere in the Final Office Action dated February 20, 2009 that the cited references, including the Kawasumi, Adachi and/or Saki references teaches or suggests the substrate combination unit recited in claim 57.

On page 15 of the Examiner's answer dated September 18, 2009, the Examiner appears to take the position that the Final Office Action dated February 20, 2009 did indeed include the substrate combination unit because according to the Examiner since Kawasumi teaches that substrates are combined, attached, pressed, and cured by the methods and apparatus of Kawasumi, a substrate combination unit is thus inherently required as part of the invention of Kawasumi. In addition, the Examiner states that there seem to be no structural limitations which distinguishes the substrate combination unit from other elements of claim 57 such as the first loading unit and/or the in-line convey unit. More specifically, the Examiner appears to take the position in the Examiner's answer that since the substrate combination unit of claim 57 lacks structural limitations, the claimed substrate combination unit is considered as clearly being met by either Kawasumi or Sakai because Kawasumi and Sakai each teach combining substrates.

In response, Applicants disagree with the Examiner that above-mentioned substrate combination unit recited in claim 57 has not been structurally defined in the application and that the substrate combination unit of claim 57 is met by either the Kawasumi and Sakai references. In this regard, Applicants direct the Examiner to the present application in which an exemplary embodiment of the present invention clearly defines the structure, function and structural relationship between each of the above-mentioned elements recited in claim 57, including the substrate combination unit, as would be readily understood by one of ordinary skill in the art.

For example, the Examiner's attention is directed to an exemplary embodiment within the scope of claim 57 which illustrates and describes a first loading unit 1000, a substrate combination unit 6000, a convey unit 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, a substrate attaching unit 8000 having a vacuum chamber which includes a first compression plate 8100 and a second compression plate 8200 and an exposure unit to conjoin the substrates in a vacuum state as part of an in-line system for manufacturing liquid crystal displays on, for example, **on pages 6, 10 and 11 and Fig. 3 of the present application**. In the above exemplary embodiment, a substrate 110 is transported to the substrate combination unit 6000 via in-line convey unit 1150 and a substrate 120 is transported to the substrate-combination unit 6000 through in-line convey unit 1160. Next, the two substrates 110, 120 are transported from the substrate combination unit 6000 via in line conveying unit 1170 to the substrate attaching unit 8000 and the substrates 110, 120 are attached to one another in a vacuum state in the substrate attaching unit 8000.

Accordingly, it is submitted that one of ordinary skill in the art would readily understand based upon the claim language of claim 57, the above-mentioned exemplary embodiment of the present invention and their knowledge in the art, that the first loading unit 1000, the substrate combination unit 6000, the substrate attaching unit 8000 and the convey unit 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180 are all separate elements from one another in the in-line system of claim 57. Furthermore, it is submitted that one of ordinary skill in the art would also readily understand based upon the claim language of claim 57, the above-mentioned exemplary embodiment of the present invention and their knowledge in the art, the specific structure of each of the first loading unit 1000, the substrate combination unit 6000, the substrate attaching unit 8000 and the convey unit 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180 and the specific structural relationship between each of the above-mentioned elements within the in-line system for manufacturing liquid crystal displays recited in claim 57 and also that each of the first loading unit 1000, the substrate combination unit 6000, the substrate attaching unit 8000 and the convey unit 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180 perform different functions from one another within the in-line system for manufacturing liquid crystal displays recited in claim 57.

Thus, contrary to the Examiner's position in the Examiner's answer dated September 18, 2009, the structure of the substrate combination unit recited in claim 57 has been clearly defined in the application for at least the reasons set forth above and thus the Examiners contention that this element has not been structurally defined is without merit. In addition, the Examiner's

contention that the substrate combination unit 6000 is included in the teaching of Kawasumi and Sakai because the Kawasumi and Sakai reference each teach combining substrates is also without merit because although the Kawasumi and Sakai references each teach combining substrates, the Kawasumi and Sakai references each teach doing so in a significantly different manner using different apparatuses than the in-line system recited in claim 57 and in addition the Kawasumi, Adachi and Sakai references, are also clearly silent regarding a substrate combination unit having the structure, function and structural relationship with the other elements as the substrate combination unit of the in-line system recited in claim 57. Accordingly, the Examiner has thus not established that either of the teachings of Kawasumi or Sakai expressly or inherently include the substrate combination unit as recited in claim 57.

Therefore, for at least the reasons set forth above, the combination of Kawasumi in view of Adachi and Sakai at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

In sum, the Kawasumi, Adachi and Saki references are not combinable in the manner set forth in the Final Office Action dated February 20, 2009 because the Kawasumi reference teaches away from this combination. In addition, even assuming arguendo, that the Kawasumi, Adachi and Saki references were combinable, this combination would still fail to teach or suggest all of the features recited in claim 57 for at least the reasons set forth above. Accordingly, for at least the reasons set forth above, the above rejections to claim 57 under 35 U.S.C. §103(a) should be reversed.

**B. Claims 58 and 60 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai as applied to claim 57 above, and further in view of U.S. Patent No. 2,394,293 to Deem ("the Deem patent").**

(i) The Deem reference fails to cure the above-mentioned deficiencies of Kawasumi and Adachi references with regard to claim 57 and as claims 58 and 60 depend from claim 57, these dependent claims are likewise patentable over the combination Kawasumi in view of Adachi, Sakai and Deem for at least the same reasons as set forth above with regard to claim 57.

In response to the Examiner's contention in the Examiner's answer dated September 18, 2009 that Applicants cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references, Applicants submit that they did not in fact attack the references individually in the Appeal Brief dated June 22, 2009 but rather in the Appeal Brief Applicants stated and explained how claim 57 is patentable over the combination of Kawasumi in view of Adachi, Sakai and Deem and that since claims 58 and 60 depend from claim 57, claims 58 and 60 are likewise patentable over the combination of Kawasumi in view of Adachi, Sakai and Deem for at least the same reasons as set forth for claim 57. For instance, the Appeal Brief dated June 22, 2009 clearly points out how the combination of Kawasumi, Adachi, Sakai and Deem at the very least fails to teach or suggest the substrate combination unit and substrate attaching unit together in the same in-line system in combination with all of the other elements, as required by claim 57.

Accordingly, Applicants maintain their position from the Appeal Brief dated June 22, 2009 as set forth below. Claim 57 is patentable over the combination of Kawasumi in view of Adachi and Sakai. As discussed, Kawasumi, Adachi and Sakai are not combinable in the manner set forth in the Final Office Action dated February 20, 2009. In addition, even assuming arguendo that these references were combinable, the combination of Kawasumi in view of Adachi and Sakai at the very least would still fail to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.



Furthermore, the Deem patent fails to cure the above-mentioned deficiencies of the Kawasumi, Adachi and Sakai patent because the Deem patent likewise at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

Thus, claim 57 is patentable over the combination of Kawasumi in view of Adachi, Sakai and Deem. Moreover, as claims 58 and 60 depend from claim 57, these dependent claims are likewise patentable over the combination of Kawasumi in view of Adachi, Sakai and Deem for at least the same reasons as set forth above with regard to claim 57.

**(ii) The combination of Kawasumi in view of Adachi, Sakai and Deem clearly do not teach or suggest all of the specific features recited in either of claims 58 or 60.**

The Examiner contends in the Examiner's answer dated September 18, 2009 that the Deem reference clearly teaches motivation for providing parallel vacuum chambers to improve production throughput. Applicants submit that the above statement alone by the Examiner is insufficient to establish that the combination of Kawasumi in view of Adachi, Sakai and Deem teaches all of the specific features recited in claims 58 and 60 because the Examiner must at the very least establish that these references teach the specific structure for the elements recited in each of claims 58 and 60 provided as part of an in-line system for manufacturing liquid crystal displays in the specific structural arrangement required by each of claims 58 and 60. However, the Examiner has failed to establish the above.

Accordingly, Applicants maintain their position from the Appeal Brief that in addition, to the reasons set forth above in section B(i), claims 58 and 60 are even further distinguishable over the combination of Kawasumi in view of Adachi, Sakai and Deem because the Kawasumi,

Adachi, Sakai and Deem references each at the very least fail to teach or suggest all of the specific features recited in either of claims 58 or 60.

Specifically, claim 58 recites, inter-alia, “the in-line system of claim 57, wherein the substrate-attaching unit includes two or more vacuum chambers.” Next, claim 60 recites inter-alia, “the in-line system of claim 58, wherein the vacuum chambers are arranged in parallel.” For example, an exemplary embodiment within the scope of each of claims 58 and 60 which illustrates a substrate attaching unit 8000 including two or more vacuum chambers 8300-8600 arranged in parallel, a substrate attaching vacuum chamber 8700 and connecting units 1171-1174 and 1191-1194 in an in-line system can be found on, for example, **page 14, line 19-page 15, line 11 and Fig. 11 of the present application**). It is noted that the Sakai reference only discloses a vacuum chamber in which a substrate unit conjoins the first substrate and the second substrate but the combination of Kawasumi in view of Adachi, Sakai and Deem clearly do not teach or suggest the specific features of each of claims 58 and 60 including the substrate attaching unit having two or more vacuum chambers and the other above-mentioned specific features of the in-line system of claims 58 and 60.

Furthermore, it would not have been obvious to one skilled in the art to provide the specific features of each of claims 58 and 60 including the substrate attaching unit having two or more vacuum chambers and the other above-mentioned specific features of the in-line system of claims 58 and 60 because the presently claimed invention as recited in each of claims 58 and 60 solves a long-felt need in the conventional art in connection with the production of liquid crystal displays (LCD's). As is well settled under the U.S. Patent laws, a showing of a claimed invention solving a long felt need or the failure of others in the art may rebut a showing of obviousness of that claimed invention. (See MPEP 2145). As discussed in the present application, there have been difficulties in the conventional art associated with time consuming processes and reduced productivity in the manufacture of liquid crystal display devices (LCD's). (See **page 2 of the present application**). However, the presently claimed invention as recited each of claims 58 and 60 overcome these difficulties associated with the conventional art by providing an in-line system which has improved productivity in connection with the manufacture of the LCD's. (See, e.g., **page 15, lines 4-10 of the present application**). Thus, it would not have been obvious to one skilled in the art to provide the specific features of each of claims 58

and 60 including the substrate attaching unit having two or more vacuum chambers and the other above-mentioned specific features of the in-line system of claims 58 and 60.

Therefore, for at least the reasons set forth above, withdrawal of the above rejections to claims 58 and 60 is respectfully requested.

**C. Claims 61-65 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasumi in view of Adachi and Sakai, and further in view of U.S. Patent No. 5,731,860 to Harada et al. (“the Harada patent”).**

As noted in the Appeal Brief dated June 22, 2009, Applicants again wish to point out the rejection to claim 61 by the Examiner was in error because this claim was already canceled by Applicants in their response filed on December 1, 2008 with the United States Patent and Trademark Office.

**(i) The Harada reference fails to cure the above-deficiencies of Kawasumi and Adachi references with regard to claim 57 and as claims 62-65 depend from claim 57, these dependent claims are likewise patentable over the combination Kawasumi in view of Adachi, Sakai and Harada for at least the same reasons as set forth above with regard to claim 57.**

In response to the Examiner's contention in the Examiner's answer dated September 18, 2009 that Applicants cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references, Applicants submit that they did not in fact attack the references individually in the Appeal Brief dated June 22, 2009 but rather Applicants stated and explained in the Appeal Brief how claim 57 is patentable over the combination of Kawasumi in view of Adachi, Sakai and Harada and that since claims 62-65 depend from claim 57, claims 62-65 are likewise patentable over the combination of Kawasumi in view of Adachi, Sakai and Harada for at least the same reasons as set forth for claim 57. For instance, the Appeal Brief dated June 22, 2009 clearly points out how the combination of Kawasumi, Adachi, Sakai and Harada at the very least fails to teach the substrate combination

unit and substrate attaching unit together in the same in-line system in combination with all of the other elements, as required by claim 57.

Accordingly, Applicants maintain their position from the Appeal Brief as set forth below. Claim 57 is patentable over the combination of Kawasumi in view of Adachi and Sakai. As discussed, Kawasumi, Adachi and Sakai are not combinable in the manner set forth in the Final Office Action dated February 20, 2009. In addition, even assuming arguendo that these references were combinable, the combination of Kawasumi in view of Adachi and Sakai at the very least would still fail to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

Furthermore, the Harada patent fails to cure the above-mentioned deficiencies of the Kawasumi, Adachi and Sakai patent because the Harada patent likewise at the very least fails to teach or suggest an in-line system for manufacturing liquid crystal displays which includes a substrate-combination unit operatively connected to the first load unit, a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state, wherein the substrate-attaching unit comprises: a substrate-attaching vacuum chamber comprising: a first compression plate and a second compression plate; and an exposure unit hardening the sealant, in combination with all of the other features as required by claim 57.

Thus, claim 57 is patentable over the combination of Kawasumi in view of Adachi, Sakai and Harada. As claims 62-65 depend from claim 57, these dependent claims are each likewise patentable over the combination of Kawasumi in view of Adachi, Sakai and Harada for at least the same reasons as set forth above with regard to claim 57.

(ii) The combination of the Kawasumi, Adachi, Sakai and Harada references at the very least fails to teach or suggest all of the specific features recited in each of claims 62-65.

The Examiner contends in the Examiner's answer that the Harada reference clearly teaches motivation for providing vacuum chucks with holes etc. for improved yield. Applicants submit that the above statement alone by the Examiner is insufficient to establish that the combination of Kawasumi in view of Adachi, Sakai and Harada teaches all of the specific features recited in each of claims 62-65 because the Examiner must at the very least establish that these references teach the specific structure for the elements recited in each of claims 62-65 provided as part of an in-line system for manufacturing liquid crystal displays in the specific structural arrangement required by each of claims 62-65. However, the Examiner has failed to establish the above.

Accordingly, Applicants maintain their position from the Appeal Brief that in addition to the reasons set forth above in section C(i), claims 62-65 are each even further distinguishable over the combination of Kawasumi in view of Adachi, Sakai and Harada because the Kawasumi, Adachi, Sakai and Harada references each at the very least fail to teach or suggest all of the specific features recited in each of claims 62-65. For example, an exemplary embodiment within the scope of claims 62-65 illustrates the vacuum holes 8900 of the first and second compression plates 8100, 8200 of the substrate attaching unit 8000 and the support tube 8800 can be found, for example, on **pages 15, lines 17- page 16, line 23 and Figs. 12, 13A-13F of the present application**. The combination of Kawasumi in view of Adachi, Sakai and Harada clearly do not teach or suggest the specific features mentioned above in connection with the vacuum holes of the first and second compression plates of the substrate attaching unit and the support tube recited in each of claims 62-65.

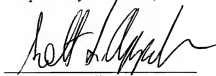
Thus, for at least the reasons set forth above, withdrawal of the above rejections to claims 62-65 is respectfully requested.

#### **IV. CONCLUSION**

For at least the reasons set forth above, the Examiner has failed to establish a prima facie case of obviousness of the presently claimed invention based upon the cited references of Kawasumi,

Adachi , Sakai, Deem, and/or Harada taken individually or in combination. Accordingly, it is respectfully requested that the Board reverse all rejections of claims 57, 58, 60 and 62-65 under 35 U.S.C. 103(a).

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Scott L. Appelbaum', written over a horizontal line.

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## CLAIMS APPENDIX

### Claims 1-56 (Canceled)

57. (Previously presented) An in-line system for manufacturing liquid crystal displays, comprising:

a first loading unit;

a substrate-combination unit operatively connected to the first load unit, the substrate-combination unit adapted to receive a first substrate from the first load unit and adapted to receive a second substrate having at least one of a sealant and a liquid crystal material deposited thereon;

an in-line convey unit; and

a substrate-attaching unit adapted to receive the first substrate and the second substrate from the substrate-combination unit via the in-line convey unit and to conjoin the substrates in a vacuum state,

wherein the substrate-attaching unit comprises:

a substrate-attaching vacuum chamber comprising:

a first compression plate and a second compression plate supporting the two substrates and applying a predetermined force toward each other; and

an exposure unit hardening the sealant.

58. (Previously presented) The in-line system of claim 57, wherein the substrate-attaching unit includes two or more vacuum chambers.

59. (Withdrawn) The in-line system of claim 58, wherein the vacuum chambers are arranged in series.

60. (Previously presented) The in-line system of claim 58, wherein the vacuum chambers are arranged in parallel.

61. (Canceled)

62. (Previously presented) The in-line system of claim 57, wherein the substrate-attaching unit further comprises:

the first compression plate and the second compression plate having at least one vacuum hole for exhausting air from between the compression plates; and

a support tube provided between the first compression plate and the second compression plate for sealing a space therebetween, the support tube having an inner space for exhausting air to adjust an interval between the first compression plate and the second compensation plate.

63. (Previously presented) The in-line system of claim 62, wherein the substrate-attaching unit has a plurality of the vacuum holes at predetermined locations for exhausting in a predetermined sequence.

64. (Previously presented) The in-line system of claim 63, wherein the vacuum holes are formed at corners or a center portion of each side of the first compression plate and the second compression plate.

65. (Previously presented) The in-line system of claim 63, wherein the vacuum holes are slits having a predetermined length.



66. (Withdrawn) The in-line system of claim 57, further comprising a liquid crystal depositing unit for depositing the liquid crystal material on the first substrate where the sealant is deposited and a second convey unit which conveys the first substrate to the substrate-combination unit after the first substrate has been processed at the liquid crystal depositing unit.

67. (Withdrawn) The in-line system of claim 66, wherein the liquid crystal depositing unit comprises a syringe-type liquid crystal depositer for depositing the liquid crystal material at specific predetermined locations in the liquid crystal cell.

68. (Withdrawn) The in-line system of claim 66, wherein the liquid crystal depositing unit comprises a spray type liquid crystal depositer for depositing the liquid crystal material over an entire surface of the liquid crystal cell.

69. (Withdrawn) The in-line system of claim 66, further comprising a sealant heat-treating unit forming a reaction-prevention layer on a surface of the sealant to prevent a reaction between the sealant and the liquid crystal material; and a third in-line convey unit which conveys the first substrate to the liquid crystal depositing unit after the first substrate has been processed at the sealant heat-treating unit.

70. (Withdrawn) The in-line system of claim 69, further comprising a sealant-applying unit depositing the sealant on the first substrate; and a fourth in-line convey unit which conveys the first substrate to the sealant heat-treating unit after the first substrate has been processed at the sealant-applying unit.

71. (Withdrawn) The in-line system of claim 70, wherein the sealant-applying unit deposits the sealant in closed loop without a liquid crystal injection hole.

72. (Withdrawn) The in-line system of claim 57, wherein the sealant is hardened by infrared rays.

73. (Withdrawn) The in-line system of claim 57, wherein the sealant includes one or more buffer regions to allow flow of excess liquid crystal material.

74. (Withdrawn) The in-line system of claim 70, wherein the first loading unit, the sealant-applying unit, the liquid crystal depositing unit, the substrate-combination unit, and the substrate attaching unit are arranged in series.

75. (Withdrawn) The in-line system of claim 70, further comprising a spacer-dispersing unit dispersing spacers on one of the first substrate and the second substrate.

76. (Withdrawn) The in-line system of claim 70, further comprising a spacer dispersing unit dispersing spacers on the first substrate; and a fourth in-line convey unit which conveys the first substrate to the sealant-applying unit after the first substrate is processed at the spacer-dispersing unit.

77. (Withdrawn) The in-line system of claim 59, wherein the vacuum chambers have different vacuum degrees.

**EVIDENCE APPENDIX:**

None

**RELATED PROCEEDINGS APPENDIX :**

None